DEFENSE INFORMATION SYSTEMS AGENCY

JOINT INTEROPERABILITY AND ENGINEERING ORGANIZATION

JOINT INTEROPERABILITY TEST CENTER
FORT HUACHUCA, ARIZONA

EXECUTIVE AGENT FOR INFORMATION SYSTEMS TESTING

ACTION PLAN

October 27, 1993

ACTION PLAN

FOR EXECUTIVE AGENT (EA)

FOR INFORMATION SYSTEMS TESTING

October 27, 1993

Joint Interoperability Test Center
Joint Interoperability and Engineering Organization
Fort Huachuca, Arizona 85613-7020

FOREWORD

This Action Plan for Executive Agent for Information Systems Testing was developed by BDM Engineering Services Company (BDM) for the Joint Interoperability Test Center (JITC) under Contract Number DABT63-91-C-0043, Form 1 Number 1666-001-X. This Action Plan incorporates comments received from the Offices of the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence, the Defense Information Systems Agency (DISA) Center for Standards, the DISA Center for Information Management, and from Internal JITC offices on the draft Action Plan dated 21 June 1993. This Action Plan defines the role of JITC as the DoD Executive Agent for Information Systems Testing.

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1. Introduction.

1.1. Purpose. The purpose of this Action Plan is to define the role of the Department of Defense (DoD) Executive Agent for Information Systems Testing. The Executive Agent (EA), supported by the Joint Interoperability Test Center (JITC), will provide the management framework for information technology standards conformance and interoperability testing within the DoD.

1.2. Organization of the Action Plan. This plan consists of four sections. This introductory section identifies the purpose of the plan and provides background for the program. Section 2 provides the goals, objectives, scope and interfaces for the Information Systems Testing Program. Section 3 identifies the actions required to establish the Executive Agent. Section 4 gives the schedule for those actions. Acronyms, references, and definitions are found in the appendices.

1.3. Background. The DoD intends to develop and acquire standards-based Command, Control, Communications, Computers and Intelligence (C4I) and information systems. Standards are the foundation for interoperability; their availability, use, and enforcement are the basis for achieving the ultimate goal of a seamless environment. At the present time, there are numerous agencies and organizations which develop standards. Examples are the Institute of Electrical and Electronics Engineers (IEEE), the International Organization for Standardization (ISO), and the Consultative Committee on International Telegraph and Telephone (CCITT). Many organizations also facilitate standards testing, however the test methodologies and test requirements vary greatly. The EA will assist DoD by acquiring and providing information for DoD acquisition of standards-based products for use in C4I and Automated Information Systems (AIS), and by developing DoD test methodologies and test requirements.

A key reference for information technology standards within DoD is the Technical Architecture Framework for Information Management (TAFIM) (Reference 1) promulgated by the Defense Information Systems Agency (DISA) Center for Information Management (CIM). The TAFIM, formerly known as the Technical Reference Model (TRM), is based on the guidelines in the Applications Portability Profile (APP) (Reference 2) produced by the National Institute for Standards and Technology (NIST).

The EA will initially concentrate on product standards conformance and interoperability testing for the TAFIM standards, but will eventually incorporate other information systems standards.

1.4. Charter. The charter for the JITC to establish the Executive Agent for Information Systems Testing was given in a memorandum from the Office of the Assistant Secretary of Defense for Command, Control, Communications and Intelligence (OASD-C3I) to DISA in July, 1992 (Reference 3). This charter was established in consonance with JITC's role as the recognized facility for interoperability testing of Command, Control, Communications, and Intelligence (C3I) systems.

1.5. Summary of Applicable Policy. A summary of selected key policy statements applicable to standards conformance testing and interoperability testing is listed below:

a. **DoD Directive 8000.1** (Reference 4) states that the Heads of the DoD Components shall "ensure that each new weapon system, or major change to an existing weapon system, is assessed for its interaction with, and integration into, the DoD Information Management infrastructure consistent with DoD Instruction 5000.2."

b. **DoD Instruction 8120.2** (Reference 5), which addresses Automated Information Systems Life-Cycle Management (LCM) process, review, and milestone approval procedures, directs the Heads of the DoD Components to ensure that standards planning, including identification of information technology standards profiles, shall be accomplished in accordance with the TRM. DODI 8120.2 also requires that information standards conformance testing and interoperability testing, as appropriate, shall be satisfactorily completed before a Major Automated Information System is deployed.

c. **DoD Instruction 4630.8** (Reference 6), addresses compatibility and interoperability of C3I systems. It directs DISA to "Certify to the developmental and operational testing organizations and to the Chairman of the Joint Chiefs of Staff that C3I systems and equipment meet the applicable standards and requirements for interoperability, compatibility, and integration based on certification testing."

d. **Chairman of the Joint Chiefs of Staff Instruction 6212.01** (Reference 7) addresses compatibility, interoperability, and integration of C4I systems.

2. Executive Agent Goals and Objectives.

2.1. Goal of Executive Agent. The goal of the Executive Agent for Information Systems Testing is to provide a management infrastructure to oversee testing of products for standards conformance and interoperability. This supports an overall DoD goal of fielding C4I and Information Systems that conform to applicable standards and meet interoperability requirements.

2.2. Objectives. The objectives of the Executive Agent are to provide the needed management for Information Systems testing, provide the process for integrating and coordinating DoD Information Systems testing efforts, and to provide DoD policy and guidance for Information Systems testing.

2.3. Roles and Responsibilities. To accomplish these objectives, the EA will review and recommend DoD testing policy, monitor the standards testing arena, facilitate testing of standards-based products, and serve as a clearinghouse for standards conformance testing information. Each of these is discussed below.

2.3.1. Policy Recommendations. The Executive Agent will review existing and emerging DoD policy in the areas of standards conformance testing, systems testing and systems acquisition. The EA will recommend policy changes to the DoD that will result in:

1. Harmonization of DoD policy for standards technology testing,

2. Common and consistent test methodologies,

3. Increased use of tested standards technology products in the acquisition cycle,

The review of existing policy will address the need for common and consistent test methodologies throughout the information systems test arena. It will identify duplications and inconsistencies. It will also identify areas in which the current directives are unclear or incomplete. Recommendations for changes to existing policies or for new policies will be submitted at the DoD level. The policy review process is shown in Figure 1.

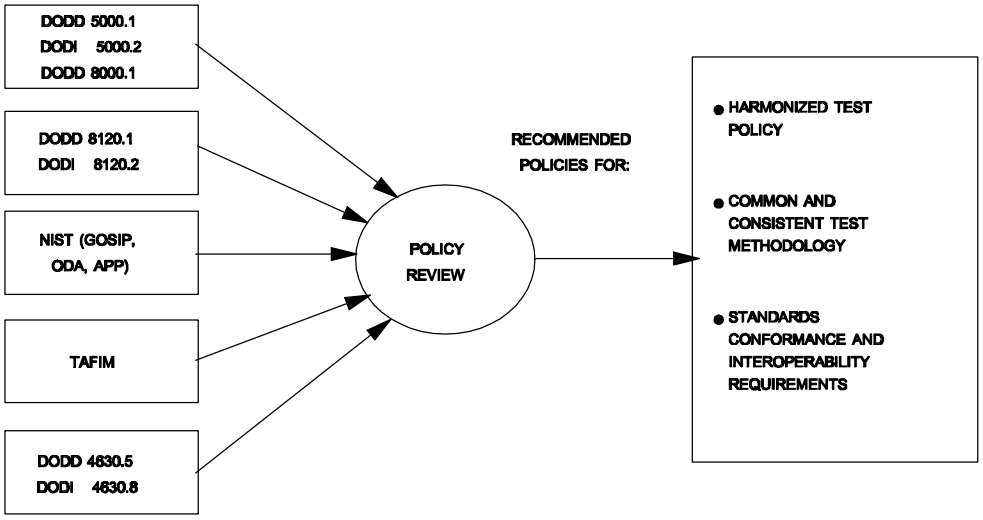


Figure 1. Policy and Guidance Review Process.

2.3.2. <u>Monitor Standards Testing Arena</u>. The Executive Agent must establish and maintain close liaison with organizations in the standards testing arena. Many of the standards organizations establish standards, develop test suites, accredit test laboratories, perform product testing, and maintain registers of tested products. Many are not affiliated with the DoD, (e.g. IEEE, ISO, and CCITT) and the EA has no means of directing or enforcing policy. Therefore, one objective of the EA will be to manage the DoD interface to the standards testing arena. This will be accomplished by gathering and maintaining current information, promoting common and consistent test methodologies, providing information for use during the DoD acquisition cycle, and facilitating DoD participation in the testing of standards technology products.

The Executive Agent must do more than merely monitor the existing state of standards technology, it must maintain an awareness of emerging standards. As standards develop, organizations to develop the new test suites, accredit test laboratories and maintain the register of tested products must be identified.

2.3.3. Promote Requirements for Testing. The EA will promote the testing of products by recommending DoD policies that require information technology standards, promoting the use of standards within DoD acquisitions, providing test information to DoD and industry, and by promoting the development and use of appropriate DoD test resources. The EA will also identify standards for which there are no test suites and will recommend which organization is best suited to fill that void.

2.3.4. Information Clearinghouse. The EA must also serve as the DoD clearinghouse of data concerning information technology standards conformance testing. As the use of standards conformant products increases, both DoD and industry will need a common source of information. The DoD will need information concerning mature standards, the status of emerging standards, how to specify them during the acquisition cycle and the locations of product registers. Industry will need information concerning test requirements, the locations of test laboratories, and how to establish their products on registers. The EA will assist in this area by providing a common source of information to the DoD and industry.

2.4. Scope. Figure 2 illustrates the scope of activities for the Executive Agent for Information Systems Testing. In the figure, items on the left serve as sources of information to the EA, while items on the right are activities that the EA will perform. For example, the EA will review DoD test policies and recommend test policies and procedures. Similarly, the EA will review the status of standards and standards test organizations as part of the activities of monitoring the standards testing arena and serving as an information clearinghouse.

2.5. Interfaces. The Executive Agent for Information Systems Testing will interface with the activities and organizations shown in figure 3. The EA interface with the Joint Interoperability and Engineering Organization (JIEO) will include the DISA Center for Standards (CFS) which is the Executive Agent for DoD Information Standards. Activities at the CFS interface will focus on new and emerging standards and test requirements. Also under JIEO is the JITC, which operates the Open Systems Conformance and Interoperability Laboratory in which it currently conducts standards testing for Government Open System Interconnection Profile (GOSIP). The JITC also operates the Electronic Key Management System (EKMS) test laboratory, the National Imagery Transmission Format (NITF) conformance test laboratory and the LIBERTYCAP development laboratory. The EA interface with standards organizations will include: IEEE, ISO, the National Institute of Standards and Technology (NIST), the American National Standards Institute (ANSI), CCITT, the Standards and Application Promotion Group (SPAG) and the Data Communications Protocol Standards Technical

Management Panel (DTMP) and will focus on the status of current standards. Similarly, the EA interface with test facilities will include testing organizations associated with the above mentioned standards organizations, and will focus on test requirements, abstract test suites, means of testing, accreditation procedures, and status of certified product lists. The EA interface with Program Managers and vendors should occur as they seek information from the EA information clearinghouse.

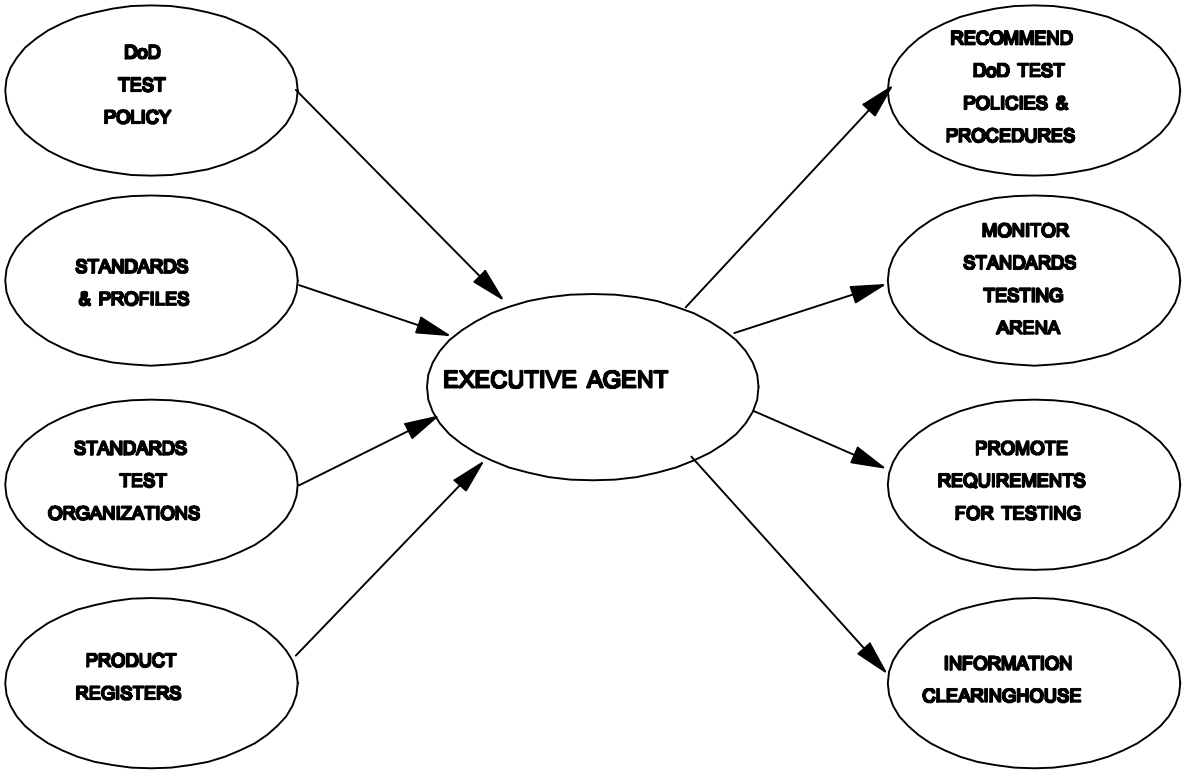


Figure 2. Scope of Executive Agent Activities.

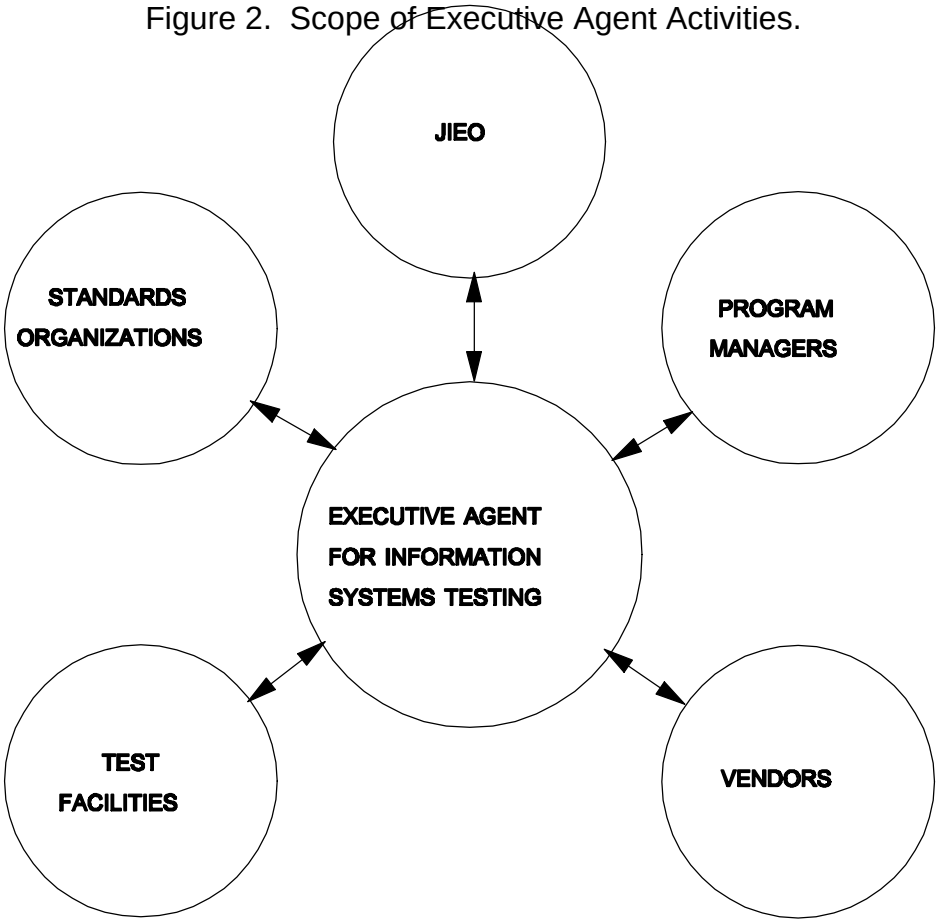


Figure 3. Executive Agent Interfaces.

3. Establishing the Executive Agent.

3.1. Initial Actions. Among the initial actions of the EA are publishing testing guides, surveying test capabilities, producing a product register and developing a program chart. Each of these is discussed below.

3.1.1. Test Guides. Publishing DoD Guidance for Product Standards Conformance Testing and DoD Guidance for Product Interoperability Testing will promote a consistent

approach toward testing products for the DoD. The Product Standards Conformance Testing Guide will support both testing agencies and organizations producing products by defining product standards conformance testing requirements. The same is true for the Product Interoperability Testing guide. These guides will be the result of an engineering practices study on standards conformance and interoperability testing. This study will include a review and evaluation of ISO Standard 9646 on conformance testing. The guides will capitalize on previous efforts under the GOSIP test program.

3.1.2. Test Facility Survey. There is an existing network of standards organizations and the test facilities they accredit. The EA will survey both DoD and industry test organizations and facilities. The goal of the survey is to identify test organizations, their test capabilities, methodologies, and the products that they test. This information will be made available to DoD and industry.

3.1.3. Program Chart. A first step in becoming a clearing house for standards testing information is to develop an Information Standards Testing Program Chart. The chart will be a summary listing linking TAFIM standards to test facilities. The listing will address the following:

a. Number/version of each standard,

b. Organizations authorized to certify conformance test laboratories,

c. Organizations authorized to certify interoperability test laboratories,

d. Individual conformance test laboratories,

e. Individual interoperability test laboratories

f. The conformance test suite number and version,

g. The interoperability test suite number and version,

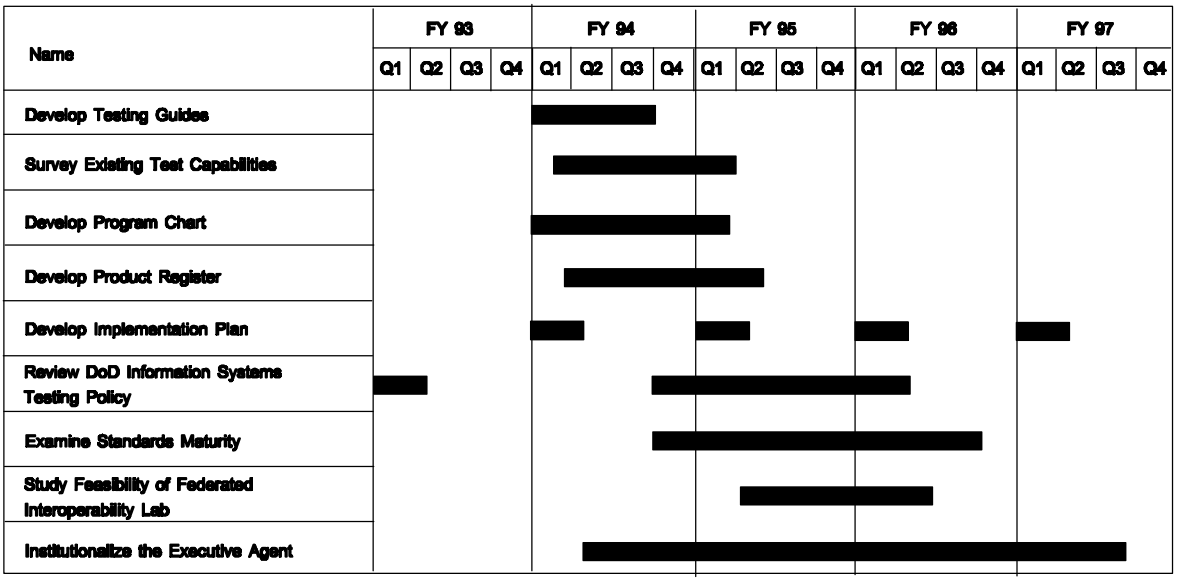
h. The organization responsible for maintaining the product conformance register, if any, and

i. The organization responsible for maintaining the product interoperability register.

The Program Chart will be updated on a quarterly basis and will be made available for use by DoD and industry. Table 1 shows the Program Chart with information concerning FIPS PUB 151-2.

TRM BREAKDOWN		STATUS OF STANDARD DEVELOPMENT		TEST INFORMATION				
SERVICE AREA	SERVICE	STANDARD STATUS	NOTES	PRODUCT CONFORMANCE TESTING				
				TEST SUITES	LABORATORY ACCREDITATION ORGANIZATION	ACCREDITED LABORATORIES	VALIDATED PRODUCT LIST	NON-ACCREDITED LABORATORIES
OPERATING SYSTEM	KERNEL	CONSENSUS	FIPS PUB 151-2 Portable Operating System Interface (POSIX) May 1993 Adopts ISO/IEC 9945-1:1990 NOTE: FIPS PUB 151-2 Replaces FIPS PUB 151-1 in its Entirety.	NIST-PCTS:151-2 Available from: NIST/CSL Certification Authority Building 225 Room B266 National Institute of Standards and Technology Gaithersburg, MD 20899	Certification Authority: The Director of NIST/CSL Laboratory Accreditation: The National Voluntary Laboratory Accreditation Program (NVLAP)	DataFocus Inc. 12450 Fair Lakes Circle, Suite 400 Fairfax, VA 22033 (703) 631-6770 Mindcraft Inc. 410 Cambridge Avenue Palo Alto, CA 94306 (415) 323-9000	National Institute of Standards and Technology (NIST) Computer Systems Laboratory B266 Technology Building Gaithersburg, MD 20899 (301) 975-3276	
				PRODUCT INTEROPERABILITY TESTING				
				TEST SUITES	LABORATORY ACCREDITATION ORGANIZATION	ACCREDITED LABORATORIES	VALIDATED PRODUCT LIST	NON-ACCREDITED LABORATORIES

Table 1. Program Chart Example.



3.1.4. Products Register. Current registers of tested and certified products are essential when those products are required for DoD acquisition programs. Many of the organizations that perform standards conformance testing also maintain the list of tested and certified products. The EA has no desire to duplicate the efforts of existing organizations, but it will review the listings for currency and accuracy and will make the listings available to DoD acquisition programs, along with comments concerning testing methodology.

4. Schedule of Actions. This section provides the schedule of actions to establish the EA. Figure 4 shows the top level schedule. The specific actions are as follows:

a. Develop and publish testing guides for standards conformance and interoperability testing

b. Survey existing test capabilities

c. Develop a program chart.

d. Produce a product register.

e. Develop an Implementation Plan. The Implementation Plan will provide the detailed approach for implementing the action plan, to include establishing the DoD Information Systems Test Program.

f. Review DoD information systems testing policy. Recommend proposed new policy, as required.

g. Examine standards maturity. Identify developing standards that will require standards conformance test suites.

h. Conduct a study to determine the feasibility of a Government led Federated Interoperability Lab effort.

i. Institutionalize the Executive Agent for Information Systems Testing. Toward this end the EA will coordinate with and brief affected agencies, participate in working groups and attend seminars.

Figure 4, Schedule of EA Activities

APPENDIX A
Acronyms

AIS	Automated Information Systems
ANSI	American National Standards Institute
APP	Applications Portability Profile
C3I	Command, Control, Communications, and Intelligence
C4I	Command, Control, Communications, Computers and Intelligence
CCITT	Consultative Committee on International Telegraph and Telephone
CFS	Center for Standards
CIM	Center for Information Management
DoD	Department of Defense
DISA	Defense Information Systems Agency
DTMP	Data Communications Protocol Standards Technical Management Panel
EA	Executive Agent
EKMS	Electronic Key Management System
GOSIP	Government Open System Interconnection Profile
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Organization for Standardization
JIEO	Joint Interoperability and Engineering Organization
JITC	Joint Interoperability Test Center
LCM	Life-Cycle Management
NIST	National Institute for Standards and Technology
NITF	National Imagery Transmission Format
OASD-C3I	Office of the Assistant Secretary of Defense for Command, Control, Communications and Intelligence
ODA	Office Document Architecture
TAFIM	Technical Architecture Framework for Information Management

TRM Technical Reference Model

SPAG Standards and Application Promotion Group

APPENDIX B
References

1. DoD Technical Architecture Framework for Information Management, Volume 3, Reference Model and Standards Profile, Version 1.3, December 31, 1992.

2. Application Portability Profile (APP), The U.S. Government's Open Systems Environment Profile OSE/1, Version 1.0, NIST SP-500-187, April, 1991.

3. OASD-C3I Memorandum for Director DISA, July 17, 1992, Subject, Establish an Executive Agent for DoD Information Systems Testing.

4. DoD Directive 8000.1, Defense Information Management (IM) Program, October 27, 1992.

5. DoD Instruction 8120.2, Automated Information System (AIS) Life-Cycle Management (LCM) Process, Review, and Milestone Approval Procedures, January 14, 1993.

6. DoD Instruction 4630.8, Procedures for Compatibility, Interoperability and Integration of Command, Control Communications, and Intelligence Systems, November 18, 1992.

7. Chairman of the Joint Chiefs of Staff Instruction 6212.01, Compatibility, Interoperability, and Integration of Command, Control, Communications, Computers, and Intelligence Systems, July 30, 1993.

8. DoD Instruction 5000.2, Defense Acquisition Management Policies and Procedures, February 23, 1991.

9. DoD Directive 4630.5, Compatibility, Interoperability, and Integration of Tactical Command, Control, Communications, and Intelligence Systems, November 12, 1992.

10. DoD Directive 8120.1, Life-Cycle Management (LCM) of Automated Information Systems (AISs), January 14, 1993.

11. DoD Directive 8320.1, DoD Data Administration, September 26, 1991.

12. DoD Directive 5000.1, Defense Acquisition, February 23, 1991.

APPENDIX C
Definitions

This appendix provides definitions for terminology used in the Action Plan; this appendix consists of two parts. The first part provides definitions found in ISO Guide-2-1986. Additional relevant terminology not addressed in ISO Guide-2-1986 is defined in the second part.

Part 1: Definitions from ISO Guide-2-1986.

accredited laboratory: Testing laboratory to which accreditation has been granted.

certification body: Body that conducts certification of conformity.

NOTE - A certification body may operate its own testing and inspection activities or oversee these activities carried out on its behalf by other bodies.

certification of conformity: Action by a third party, demonstrating that adequate confidence is provided that a duly identified product, process or service is in conformity with a specific standard or other normative document.

certification system: System that has its own rules of procedure and management for carrying out certification of conformity.

certificate of conformity: Document issued under the rules of a certification system, indicating that adequate confidence is provided that a duly identified product, process or service is in conformity with a specific standard or other normative document.

compatibility: Suitability of products, processes or services for use together under specific conditions to fulfill relevant requirements without causing unacceptable interactions.

conformity: Fulfillment by a product, process or service of all requirements specified.

consensus: General agreement, characterized by the absence of sustained opposition to substantial issues by any important part of the concerned interests and by a process that involves seeking to take into account the views of all parties concerned and to reconcile any conflicting arguments.

NOTE - Consensus need not imply unanimity.

draft standard: Proposed standard that is available generally for comment, voting or approval.

harmonized standards: Standards on the same subject approved by different standardizing bodies, that establish interchangeability of products, processes and services, or mutual understanding of test results or information provided according to these standards.

interface standard: Standard that specifies requirements concerned with the compatibility of products or systems at their points of interconnection.

laboratory assessment: Examination of a testing laboratory to evaluate its compliance with specific laboratory accreditation criteria.

product standard: Standard that specifies requirements to be fulfilled by a product or a group of products, to establish its fitness for purpose.

requirement: Provision that conveys criteria to be fulfilled.

service standard: Standard that specifies requirements to be fulfilled by a service, to establish its fitness for purpose.

standard: Document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.

technical specification: Document that prescribes technical requirements to be fulfilled by a product, process or service.

NOTES:

1. A technical specification should indicate, whenever appropriate, the procedure(s) by means of which it may be determined whether the requirements given are fulfilled.
2. A technical specification may be a standard, a part of a standard, or independent of a standard.

test: Technical operation that consists of the determination of one or more characteristics of a given product, process or service according to a specified procedure.

test method: Specified technical procedure for performing a test

test report: Document that presents test results and other information relevant to a test.

testing laboratory: Laboratory that performs tests.

testing laboratory accreditation: Formal recognition that a testing laboratory is competent to carry out specific tests or specific types of tests.

testing laboratory accreditation body: Body that conducts and administers a laboratory accreditation system and grants accreditation.

NOTE - An accreditation body may wish to delegate fully or partially the assessment of a testing laboratory to another competent body. While it is recognized that this may be a practical solution to extending recognition of testing laboratories, it is essential that such assessment be equivalent to that applied by the accreditation body and that the accreditation body take full responsibility for such extended accreditation.

testing laboratory accreditation system: System that has its own rules of procedure and management for carrying out laboratory accreditation.

testing standard: Standard that is concerned with test methods, sometimes supplemented with other provisions related to testing, such as sampling, use of statistical methods, sequence of test.

Part 2: Additional Definitions.

certification of interoperability: Action by a third party, demonstrating that adequate confidence is provided that a duly identified product, process or service can interoperate with other products, processes or services that adhere to a specific standard or other normative document.

interoperability: The ability of two or more products, processes or services to jointly provide a defined collection of operations, processes or services.